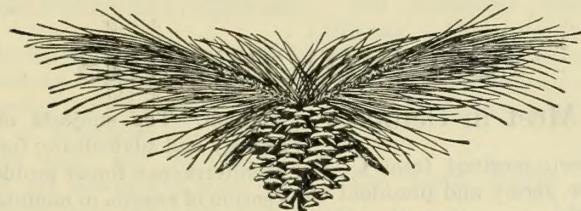


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FOREST WORKER



soil with another soil to be found in the forest floor. This soil is often very light-colored and has a high water-holding capacity. It is usually found in areas where there is a great deal of shelter from strong winds, and it is often associated with the more protected forest areas. The types of trees found in this soil are generally those that are well adapted to growing in sheltered areas. These include such species as Douglas fir, Sitka spruce, and western hemlock. They are also found in areas where there is a great deal of rainfall.

In some areas, this soil is called "wetland soil" because it is saturated with water.

This soil is often found in areas where there is a great deal of rainfall, and it is usually found in areas where there is a great deal of shelter from strong winds. It is often associated with the more exposed areas, and it is often found in areas where there is a great deal of rainfall. The types of trees found in this soil are generally those that are well adapted to growing in exposed areas. These include such species as Douglas fir, Sitka spruce, and western hemlock. They are also found in areas where there is a great deal of rainfall.

July, 1932

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UNITED STATES DEPARTMENT OF AGRICULTURE**

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Announcements

State Foresters to Meet in October

Preliminary notice has been received from C. P. Wilber, State forester of New Jersey and president of the Association of State Foresters, that the 1932 meeting of the association will be held in New Jersey, October 17, 18, and 19. Details of the program will be announced later. Following the meeting in New Jersey, members of the association will have the opportunity of making a brief survey of forests and forest work in New York State through arrangements made by W. G. Howard, superintendent of lands and forests of New York.

Congress of Forest Research Organizations

The International Union of Forest Research Organizations will hold a congress at Nancy, France, September 4 to 11, 1932. Several optional tours, before, during, and after the meetings at Nancy, have been arranged for members who wish to study at first hand the forest regions of France. The congress will be divided into six sections, meetings of which will be so scheduled as to enable members to follow the work of several sections. Discussions will be held in English, French, and

German. The subjects of the sections are: Forest ecology and silviculture; forest utilization; tropical and Mediterranean forest problems; reforestation and prevention of erosion in mountain regions; pedological and climatological forestry; protection of forests, including fire protection, forest pathology, and forest entomology.

The section of forest entomology planned to meet at Nancy during the second half of July, immediately following the Fifth International Congress of Entomology in Paris, for the convenience of members desiring to attend both meetings.

Dedication of Louis Marshall Memorial Building at Syracuse

November 18, 1932, has been approved as the date for the dedication of the Louis Marshall memorial building at the New York State College of Forestry, Syracuse University, Syracuse, N. Y. It is expected that the building will be completed by that date. Leading foresters of this country and abroad will participate in the event, and the tentative program includes several internationally known speakers. Samuel N. Spring, assistant dean of the college, is chairman of the committee on arrangements.

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FOREST WORKER

Washington, D. C.

JULY, 1932

Vol. 8, No. 4

State Forestry

New Fire-Suppression Policy in California

Forest fires in California during the season of 1932, on both State lands and national forests, will be fought by organized fire crews only, without resort to the employment by the hour of temporary fire fighters. Twenty crews of 20 men each will be regularly employed at a rate of \$25 per month and board and will be located strategically through the State, with a foreman in charge of each crew wherever necessary. Additional help may be obtained by hiring crews already organized and employed by the State division of highways or by water, lumber, power, and other companies; in cases where still further help is needed, local citizens may be hired at 20 cents per hour and board; and State forest officers may hire a few men for initial attack upon fires before the organized suppression crew can arrive, at 25 cents per hour and board. These precautions have been made necessary by the number of incendiary fires set last year by unemployed men for the purpose of obtaining work fighting the fires.

The State board of forestry has divided the area of the State under its protection into three classes: (1) Areas of greatest state-wide importance, embracing watersheds, timber, and recreation; (2) areas not of state-wide importance but needing intensive protection to secure class 1 areas, and, in a few localities, areas where extensive protection must be given regardless of the threat to class 1 lands on account of cooperative agreements with counties and other local agencies who are supplying part of the funds; (3) areas not of general importance where protection should be provided by the local residents, including principally grass and grain lands, and areas where local protection is more a matter of community interest than a forest problem.

The zoning of the State into these three classes is progressing reasonably fast, about three-fourths of the entire area having been classified already. It is expected that numerous changes in exact zone boundaries will be made from time to time, but the general scheme is to be permanent.

The California State Chamber of Commerce, through a forest-fire emergency committee, is cooperating with the division of forestry and the United States Forest Service in organizing groups of citizens to help in the prevention of forest fires.

New York Adds 24,000 Acres to Forest Preserve

Announcement of the purchase of 24,000 acres of land to be added to the State's forest preserve has been made by the New York Conservation Department. One tract of 21,000 acres in northern Herkimer County, near the Beaver River, the largest block to be added to the preserve in recent years, is extensively wooded with virgin forests. The other tract consists of 3,000 acres, comprising Howland's Island in the Seneca River east of Seneca Falls in Cayuga County, Campbell or Busk Island, and a portion of mainland known as Bluff and Hard Points. This area is abandoned farm land, only partly wooded, and will be developed into a game refuge or public hunting ground.

"These purchases," said Conservation Commissioner Henry Morgenthau, jr., "show that although the State is obtaining large tracts of land outside of the forest preserve for reforestation purposes, it is not neglecting the preserve itself but is constantly increasing its extent."

Alabama Acquires New State Forest

A tract of approximately 5,000 acres has been donated to the State of Alabama for a State forest by the Jackson Lumber Co. The gift was made as a means of stimulating interest in timber production on nonagricultural lands in the State. Although the area, which lies in the western part of Geneva County, has been logged over, it contains a considerable amount of young growth. As a State forest it will be devoted to experiments in forestry methods of reestablishing and managing timber growth, and demonstrations of results.

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Forest Fires and Fire Protection in 1931

By A. B. HASTINGS, United States Forest Service

During the calendar year 1931, 186,894 forest fires burned over an area of 51,578,310 acres in the United States (exclusive of Alaska), according to statistics compiled by the Forest Service from reports and estimates received from States cooperating with the Federal Government in forest-fire control and from national-forest officers. Corresponding figures for 1930 are 190,980 fires and 52,266,460 acres burned over. Since much of the privately owned forest land in the country is not under any form of organized protection, data for such land have necessarily been compiled from rough approximations; the total area under protection in 1930 and 1931 was 227,500,000 acres, on which 61,854 fires burned over 6,378,340 acres in 1931, as against 70,832 fires and 5,809,000 acres in 1930. Of the total burned area, 88 per cent was unprotected.

The average area burned per fire on the protected area in 1931 was 103 acres, and in 1930, 82 acres; for the 5-year period 1926-1930 it was 100 acres. It is interesting to note that there was a marked decrease last year in the size of the average fire on protected areas in the Northeastern, Middle Atlantic, Southeastern, and Gulf groups of States.

Incendiarism is the reported cause of fires on 24.9 per cent of the area burned within protected units, in contrast to 17.1 per cent for the previous five years. Sharp increases in incendiarism are noted in the Southeastern, Gulf, Central, and Pacific States. Area burned by fires attributed to miscellaneous causes also increased, jumping from 10 per cent for the 5-year period to 15.7 per cent in 1931.

The \$7,216,885 spent in the cooperative protection of State and privately owned lands from forest fires in the calendar year 1931 was from the following sources: States, \$3,839,305; private owners, \$1,844,638; the Federal Government, \$1,532,942.

Reforestation Work in New York Exceeds Schedule

Planting work already done in New York exceeds the quota for the entire year under the State's reforestation program. On more than 20,000 acres of abandoned farm land, purchased under the provisions of the reforestation amendment passed by the legislature last November, more than 22,000,000 trees have been planted, according to reports received from all over the State by Conservation Commissioner Henry Morgenthau, jr. In this work employment was given for periods of two to six weeks each to more than 5,000 men selected from unemployment relief lists in the counties in which the planting was done.

In order to handle systematically the work of land acquisition, tree planting, and forest management of

the plantations, the State has been divided by the conservation department into 10 districts under the following district foresters: R. H. Hick at Oneonta; C. E. Baker at Norwich; J. D. Kennedy at Cortland; I. S. Bowlby at Bath; H. E. Dobbins at Jamestown; G. M. Powell at Lowville; W. F. Pratt at Canton; A. J. Woodford at Herkimer; C. P. Fatzinger at Hudson Falls; and C. D. Kingsbury at Fleishmans.

East Mississippi Protective Association

Landowners in eastern Mississippi have formed a new forest-patrol association which, with State cooperation, will undertake fire-protection measures affecting 145,000 acres of their property. Of this total 125,000 acres is owned by the Sumter Lumber Co., of Electric Mills, and about 20,000 acres is listed by the East Mississippi and West Alabama Game and Fish Association. The forest type is principally shortleaf, with some slash and longleaf areas. Approximately 90,000 acres of the Sumter Lumber Co. land has been cut over. In general this cut-over land now bears good stands of second-growth timber.

Rhode Island Passes Registration Act

A law passed during the 1932 session of the Rhode Island General Assembly requires that any person, firm, or corporation owning standing trees shall register with the State bureau of forestry before cutting or sawing such trees for other than domestic use. In addition, sawmill operators shall report the location of all sawmills to the forest warden of the town or city in which they are to be operated. Through these requirements the bureau of forestry will be provided with more definite information on the annual cut of wood products in the State, and will also be able to obtain closer cooperation from sawmill operators in the reduction of fire hazards.



A marked difference between the condition of pine reproduction within those areas in Oklahoma systematically protected from forest fires and that on unprotected areas has been observed by George R. Phillips, State forester of Oklahoma. According to Mr. Phillips young pines are getting a fine start on large areas inside the protected units, while outside there is practically no pine growth.



Spring planting plans for the State and municipal forests of Vermont called for approximately half a million trees of various species, among which red pine and Norway spruce predominated. Eight Vermont towns ordered a total of 110,500 trees for planting on municipal lands.

Timber Protective Association Disbands

After 26 years of cooperative timber protection work in Idaho, the Coeur d'Alene Timber Protective Association is disbanding because of the inability of many of the private lumber companies and individual timber owners who comprise its membership to continue to pay their proportionate shares of the cost of maintaining protection. The association, which has cooperated closely with the State forester of Idaho and the Federal Forest Service in protecting its members' lands from fire, was the oldest of its kind in the United States. Efforts to protect the area will be continued by State Forester Ben. E. Bush, the State Land Board, and the Forest Service.

Maryland Administers Safety-Strip Law

Railroad companies which failed to comply with the Maryland law that requires them to clean 100-foot safety strips along their lines within hazard areas before the fire season begins were obliged this spring to send a motor-car patrol equipped with fire-fighting tools within 5 minutes behind each train operating through these areas, or face court action. Patrols were promptly supplied by the several companies notified, and cleaning of the safety strips was immediately begun.

The Maryland Department of Forestry administers this law, which was passed in 1924 and provides for fines for companies not complying with its requirements. Careful inspections were made of all the rights of way by district foresters and district forest wardens before the railroads were requested to supply the patrol.

Increased Production and Distribution of Planting Stock by States in 1931

A substantial increase in 1931 over any previous year in the production and distribution by the States of forest planting stock is shown in official reports received by the United States Forest Service. During the past year 102,856,770 young trees were produced and distributed by the 38 States which were engaged in this activity and Hawaii and Puerto Rico. This total represents an increase of nearly 30 per cent over the 79,319,629 trees distributed in 1930, and doubles the distribution of five years ago, only 56,000,000 trees having been distributed in 1927.

In 1931 the forest trees provided by the States, in cooperation with the Federal Government, for planting on farms numbered 25,510,052, less than the number used for this purpose in 1930 by 326,163. Trees distributed for planting on lands other than farms increased somewhat in number, with 24,839,109 in 1931 against 23,039,760 in 1930. The large increase in the total over that for the preceding year is accounted for

mainly by the greater number of trees produced for planting on State lands, 52,507,609 having been used for such work in 1931, or 22,063,955 more than in 1930.

Again, as in previous years, New York led in number of trees distributed with a total of 41,211,500, an increase of 16,250,800 over 1930 and of 15,843,800 over 1929; Michigan, in second place, a position held also for several years, reported 23,871,248. Pennsylvania led in the distribution to farmers with 6,028,835 trees. New York and Michigan together planted 43,000,000 trees on their State forests, the number being almost evenly divided between them.

Total distributions of more than a million trees each were made by Pennsylvania, with 8,646,394; Wisconsin, 3,863,300; Ohio, 3,572,055; Massachusetts, 3,289,325; Connecticut, 2,075,703; Indiana, 2,042,100; Vermont, 1,399,525; Puerto Rico, 1,393,400; New Jersey, 1,264,925; and New Hampshire, 1,209,420.

Expenditures by the States for the production and distribution of planting stock during 1931 amounted to \$679,540, including \$93,334 contributed by the Federal Government under the Clarke-McNary law.

Wisconsin Builds New Fire Towers

Twenty-nine new fire towers, seventeen for new locations and twelve for replacements, are to be constructed in Wisconsin this year. Ten were completed in March and April and used during the spring fire season. The towers, which will vary in height from 68 to 100 feet, are of a new design which combines the best features of State and Federal towers already in use and introduces a number of improvements. Four smaller additional towers will be erected with material salvaged from those torn down. Some of the labor used in this work has been employed under the \$500,000 unemployment relief program of the State.



Three days of unusual forest fire weather in Texas this spring, March 20 to 22, caused the burning by 300 fires of approximately 25,000 acres of forest land during that short period. For the entire fire season, however, the average size of the individual fire was reduced from 76 acres in 1930 to 46 acres in 1932, with the total acreage burned reduced by 26,000 acres. W. E. White, chief of the division of forest protection of Texas, attributes these reductions to the improved system of lookouts and telephone lines established since last year.



The city of Rutland, Vt., has been doing intensive work on its 3,500 acres of municipal forest and also on a large wooded area within the limits of the city. During the winter work was given to unemployed men who, under the supervision of W. E. Bradder, district forester, cut fire lines and thinned out worthless brush.

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Georgia Establishes New State Nursery

Under the direction of H. M. Sebring and H. D. Story, jr., district foresters, the division of forestry of the Georgia Department of Forestry and Geological Development established a new State tree nursery at Albany, Ga., this spring. A 6-inch well was dug by the city of Albany through the cooperation of the chamber of commerce, and the division of forestry installed a pump and an overhead sprinkling system. Ninety seed beds, covering a little more than an acre of an old field, were prepared and seeded. Eitel Bauer was appointed superintendent of the nursery.

Board of Fire Review for Connecticut

Believing that valuable suggestions might be obtained through study by impartial investigators of the handling by his department of bad forest fires, A. F. Hawes, State forester of Connecticut, appointed a board of fire review to serve during the 1932 fire season. The members of the board, none of whom is connected with the State department of forestry, are: Robert M. Ross, secretary of the Connecticut Forest and Park Association; W. O. Filley, forester of the Connecticut Agricultural Experiment Station; R. C. Hawley, professor at the Yale School of Forestry; C. R. Tillotson, district inspector, United States Forest Service; J. A. Gibbs, Connecticut extension forester; and Charles L. Gold, farmer, of Cornwall, Conn.

The first fire investigated by the board burned approximately 250 acres on the Cockaponset State Forest. The area was inspected by members of the board and the following recommendations were made: That the crews be commended for effective handling of the fire under difficult conditions; that an auxiliary lookout station be established on one of the higher points of the forest, and that it be equipped with temporary telephone and manned on days when there is great fire danger; that the State provide enough power pumps so that there will be at least one available in each county; that the attention of the officials of the town of Haddam be called to the fact that the Old County Road was flooded by the Turkey Hill Reservoir, making

it impossible for the fire truck to get through to the head of the fire from the east and causing much valuable time to be lost and additional land burned because the truck had to make a circuit of about 6 miles over poor roads.

Chinese Trees Recommended for Planting in Louisiana

Growing of tung-oil trees on portions of the cut-over lands in the State is recommended by the division of forestry of the Department of Conservation of Louisiana. The oil extracted from the nut of this Chinese tree has many uses and brings a high price. Experiments in the cultivation of this species have been made by the division of forestry, the Great Southern Lumber Co., and individual farmers and landowners with encouraging results. It promises to be of considerable value as a supplementary crop.

Work Record of California Unemployment Camps

At least \$40,000 worth of work was accomplished by men in the 10 unemployment camps maintained by California within and adjacent to national forests in the State during the past winter. The work, which was done under the supervision of national-forest officers in cooperation with State authorities, amounted to 36,196 total man-days of six hours each. More than 91 miles of road were cleared; 12.3 miles of new roads were built; 15.1 miles of firebreaks were constructed; 32.45 miles of telephone lines were built; 2,610 snags and 516 infested trees were felled; 10,000 trees were planted; and in addition many miles of existing roads, firebreaks, and telephone lines were maintained in good condition.



The Oregon State Forestry Department has recently adopted a badge to be worn by its employees. It is of bright copper, shield shaped, with the State seal in the center.

Education and Extension

Syracuse Summer School Offers Forestry Courses

In response to a demand from many of the teachers attending the Syracuse University Summer School sessions, particularly those interested in biology, geography, and social sciences, a course in forestry has been inaugurated this year under the auspices of the

New York State College of Forestry. Joseph S. Illick, head of the department of forest management of the college, will be in charge of the summer work. The courses to be offered are, briefly: General forestry; identification, life history, ecology, and use of trees of the Eastern States; and instruction and practical training in planting and care of trees, including nursery practice. The session will be held July 5 to August 16.

Fence Posts Tested at Missouri Experiment Station

Tests conducted by J. C. Wooley at the Missouri Agricultural Experiment Station on fence posts of different species of wood, both treated with preservatives and untreated, established the superior serviceability in the untreated class of white cedar, osage orange, black locust, and catalpa. Untreated posts of these four woods were found to be still serviceable after 18 years of use.

The serviceable life of some of the species tested was lengthened by treatment with creosote, as shown in the following table:

Species	Service, untreated	Service, treated
	Years	Years
Sassafras	14	1 18
White oak	12	1 18
White walnut	11	14
Redbud	10	14
Black walnut	9	1 18
Black ash	7	1 18
Honey locust	5	1 18
Red oak	3	13
Black oak	3	12

¹ Some posts still serviceable.

White cedar posts which had been given a 5-hour, double-tank treatment with creosote were solid at the end of the 18-year period, but the sapwood of other treated posts was more or less rotted.

Pines and Spruces in Wooster Arboretum

Trees growing in the forest arboretum of the Ohio Agricultural Experiment Station at Wooster, Ohio, include 19 species of native pines, 13 species and 6 varieties of exotic pines, 6 species of native spruces, and 12 species and 8 varieties of exotic spruces. Pines growing in permanent location are *Pinus balfouriana*, *P. banksiana*, *P. bungeana*, *P. cembra*, *P. edulis*, *P. contorta*, *P. densiflora*, *P. echinata*, *P. excelsa*, *P. flexilis*, *P. jeffreyi*, *P. koraiensis*, *P. mugo* (syn. *P. montana*), *P. mugo mughus*, *P. mugo pumilio*, *P. nigra*, *P. nigra calabrica*, *P. parviflora*, *P. peuce*, *P. ponderosa*, *P. pungens*, *P. resinosa*, *P. rigida*, *P. strobus*, *P. sylvestris*, *P. sylvestris rigensis*, *P. tabulaeformis* (syn. *P. sinensis*), *P. taeda*, *P. thunbergii*, *P. virginiana*; additional species and varieties of pines growing in the nursery are *P. albicaulis*, *P. cembra sibirica*, *P. densiflora globosa*, *P. monticola*, *P. aristata*, *P. attenuata*, *P. pumila*, and *P. sabiniana*. Spruces in permanent location are *Picea abies* (syn. *P. excelsa*), *P. abies inversa*, *P. abies procumbens*, *P. abies pyramidata*, *P. bicolor* (syn. *P. alcockina*), *P. engelmannii*, *P. glauca*, *P. glauca Albertiana*, *P. glauca coerulea*, *P. jezoensis*, *P. koyamai*, *P. likiangensis*, *P. mariana*, *P.*

omorika, *P. orientalis*, *P. polita*, *P. pungens*, *P. pungens glauca*, *P. pungens kostermana*, *P. rubra*, and *P. sitchensis*; others in the nursery are *P. asperata*, *P. jezoensis hondoensis*, *P. schrenkiana*, *P. smithiana*, and *P. wilsonii*.

New 4-H Forestry Clubs Organized in Vermont

One group of girls and eight groups of boys organized new forestry clubs in Vermont under the direction of 4-H club agents during the past winter and spring. The girls' club, at Randolph Center, in Orange County, is the second group of girls in the State to take up forestry as a project, the first having been organized in Orleans County. The recently formed boys' clubs are located in North Randolph, Orange County; West Hartford and Norwich, in Windsor County; Peacham and Waterford, in Caledonia County; Brattleboro, Windham County; Richmond, Chittenden County; and one in Orleans County.

The first year's work of a 4-H forestry club member in Vermont consists of identification of at least 15 common trees of the State, and collecting and mounting of the twigs, buds, leaves, seed, and wood of these trees.

Colorado Forest School to be Discontinued

Ending a career of over 25 years, the Colorado School of Forestry of Colorado College will be closed in June, 1934. This decision was reached by the trustees of the college partly in consideration of the financial burden of maintaining the school, which is not self-supporting, and partly in line with a recent reorganization plan under which other technical courses of the college will also be eliminated. No new students are being accepted for the forestry course.

One of the earliest forest schools to be established in the United States, the Colorado School of Forestry has since 1906 had the benefits of ownership of more than 6,000 acres of ponderosa pine timber, located in the mountains near Colorado Springs. This tract, known as the Manitou Forest, was presented to Colorado College by Gen. William J. Palmer and Dr. William A. Bell, and has contributed a small amount of revenue through sales of timber as well as providing a field laboratory for the students. It is expected that ownership of the forest will be retained by the college.



Interest in planting black walnut trees is growing among 4-H club boys of Lincoln County, N. C., who, after setting out 2,100 seedlings of this species, have requested 200 more.

FOREST WORKER

Tree Planting on Farms Stressed in North Dakota Extension Program

Encouraging the North Dakota farmer to plant wind-breaks and shelter belts and reforest woodlands on his farm is the primary project of Extension Forester John Taylor for the coming year. Of the 70,000 farms in the State fewer than 40 per cent have adequate shelter plantings, according to Mr. Taylor, yet in North Dakota trees are necessary to protect growing crops from the hot westerly winds of summer prevalent in that region and buildings and livestock from the cold winds and drifting snows of winter. It has been shown that a good windbreak gives protection to a zone 20 times the height of the trees on the leeward side and 10 times the height of the trees on the windward side. Crops protected by shelter belts have been found to consistently outyield those unprotected. Farmers desiring to plant trees will be instructed as to appropriate species, proper planting methods, and the necessity for cultivation and protection of the trees. The advice to be given by the extension forester is based on 594 demonstration plantings in the State.

The 657,742 acres of farm woodlands in North Dakota¹ include only 1.4 per cent of the total farm land and produce no timber of good lumber quality, yet cordwood, posts, poles, and rough lumber worth \$300,000 are cut from these lands annually. Sixty per cent of the farm woods are used for pasture, and large areas are burned over every year as a result of carelessness in burning hay stubble, brush, and grass, says Mr. Taylor. His second project, therefore, is education of the owners of farm forests as to the destructive results of fires, grazing, and erosion, and the increased tree growth to be obtained through protection of the woods.

A third extension problem which will receive attention is development of new marketing ideas and methods. There is great need for dissemination among North Dakota farmers of information concerning the possibilities of farm forestry as a source of additional income.



Distribution of 951,000 forest tree seedlings and transplants to 3,500 Nebraska farmers in all counties of the State during the spring of 1932 is reported by Clayton W. Watkins, extension forester. The trees were to be planted for windbreaks and for farm woodland demonstrations. Among the 16 species distributed, Chinese elm predominated, followed by Austrian, Scotch, and jack pines.

¹ Agricultural census of 1930.

Boy Scout Forests for Florida

In cooperation with the Florida Lumber & Millwork Association and the Boy Scout organization of the State, the Florida Forest Service has planned an educational forestry project which calls for the establishment of forests by scout troops. Each troop wishing to participate in the project must obtain the use of 25 to 40 acres of forest land on which firebreaks must be maintained and fires suppressed. The aid of local residents is to be enlisted in preventing fires. Another requirement is that 2 to 5 acres of the forest must be planted by the boys with forest tree seedlings. The scout in each troop who performs outstanding work will be sent to a Boy Scout camp for one week by the Florida Lumber & Millwork Association. Fire-fighting equipment and tree seedlings will be furnished by the State forest service.

County Fairs in New York State to Exhibit Forest Plantations

Permanent forest plantations will be on exhibition at 20 county fairs to be held in New York State this summer and fall. Arrangements have been made with managers of the fairs by George E. Stevens, exhibit specialist of the New York Conservation Department, for areas of one-fourth to one-half acre to be set aside in the fair grounds as demonstration plots on each of which three to four hundred young trees planted by the conservation department will provide exhibits of forest growth. The trees, chiefly red, white, and Scotch pines, Norway spruce, and European larch, will be carefully identified for the benefit of visitors.



Two colleges in New England planted more than 150,000 trees on their forest lands this spring. Middlebury College, in Vermont, required 25,000 Norway spruce transplants to fill in small areas in its 30,000 acres of school forest. Lasell Junior College, of Auburndale, Mass., planted 125,000 trees of five different species in a forest of 1,400 acres owned by the college in Barnard and Stockbridge, Vt. Over a million trees have now been set out on this area. The stock for these plantings was obtained from the Vermont Forest Service nursery.



A "prefreshman" camp has been established by the New York State College of Forestry with the object of making earlier working contacts with prospective students and as a practical introduction to forestry. The camp will be held at the summer camping site of the college on Cranberry Lake, N. Y.

Forest Service Notes

Federal Policy Relating to Controlled Burning in Longleaf Pine Region

A policy concerning the use of controlled fires for specific purposes in the longleaf pine region has been formulated by the Forest Service. The statement setting forth this policy, although intended primarily for the use of State forestry departments cooperating with the Federal Government under section 2 of the Clarke-McNary Act, is of general interest to foresters. It is as follows:

Controlled burning or controlled fire, as used in this statement of policy, is systematic, prearranged burning, carefully performed at such times and in such a manner that the least practicable damage is done and that the fire can be confined to the specific area which the owner desires to burn. As used in this discussion, the term "controlled burning" does not apply to the burning of firebreaks.

Practically all of the land cooperatively protected under the Clarke-McNary law is in private ownership. The uses to which it will be put will be determined largely by the private owners. Public officials may properly advise forest-land owners as to the use they should make of the land and as to the methods of management best calculated to get the desired returns. In several States in the South large areas of cut-over lands are reverting to the States because of nonpayment of taxes. These States are confronted with the problem of managing cut-over land in State ownership.

The Forest Service views on the subject of the effect of fire on the various forms of forest land use and the Forest Service policy on cooperation under section 2 of the Clarke-McNary law where controlled burning is involved, are here stated. It should be understood that the statements refer only to the longleaf and the longleaf-slash pine types. There seems to be no need at this time for a statement covering the other timber types where complete exclusion of fire is commonly recognized as necessary.

CONTROLLED BURNING FOR SILVICULTURAL PURPOSES

In the opinion of some foresters fire may be used to advantage under certain conditions and for the following purposes in establishing and managing longleaf pine stands:

- (a) To burn off heavy accumulation of dead grass and litter prior to seed fall so as to permit more of the seed to reach the soil;
- (b) To reduce competition from undesirable grasses or vegetative growth following longleaf establishment;
- (c) As a means of control for the brown-spot needle disease.

The practical application of controlled burning for the above silvicultural purposes has been demonstrated only on very small areas. Granting that under certain conditions fire may accomplish these purposes, difficulty must be expected in securing this gain without at the same time incurring even greater loss. With re-

spect to the tree growth alone, this loss consists of decreased annual growth, killing of seedlings, especially in the cotyledon stage, defect originating in fire scars, and increased susceptibility to insect attacks. It must be kept in mind, too, that conditions in the longleaf type are not uniform over more than small areas; therefore, it is extremely difficult to apply fire to areas where its effect might be beneficial without at the same time burning adjoining or intermingled areas where the effect would be harmful.

CONTROLLED BURNING FOR FOREST PROTECTION

It is obvious that fire destroys inflammable material on the ground or temporarily reduces the amount of such material. A controlled fire in early winter eliminates the risk of a more severe accidental fire during the remainder of the winter and reduces the hazard during the following growing season. It does not insure immunity from fire for the entire year following the burn.

The justification claimed for controlled protective burning in the longleaf type lies in the fact that in many localities fire protection is not yet fully established and consequently, during bad fire seasons, the risk of accidental fires may be greater than the forest-land owner feels he can assume, particularly when a considerable investment is involved, as in turpentine operations. The owner, therefore, may choose to accept the losses incident to controlled burning as an insurance against greater possible losses.

There are, however, many disadvantages and objections to protective burning which indicate its undesirability even in the longleaf pine type. If done in a manner to minimize damage it may be as expensive as complete protection, and it has no justification, from the point of view of protection, if adequate protection can be had at reasonable cost without burning. Protective burning, even though carefully handled, is likely to be misunderstood by the general public. Many do not recognize the difference between it and indiscriminate, uncontrolled burning. The practice of controlled burning may tend, therefore, to perpetuate the custom of indiscriminate burning.

INFLUENCING FACTS

1. The fire laws now in force in the Southern States allow the landowner to burn his own forest land, and no burning permit is required. It is unlawful to burn land belonging to others.

2. There is no season of the year when fires will not burn in the longleaf and longleaf-slash pine types. Fire danger exists in varying degrees for 12 months in the year, although the main fire season normally occurs in the late fall, winter, and early spring. The same area has been known to burn twice within a 12-month period.

CONTROLLED BURNING ON AREAS COOPERATIVELY PROTECTED UNDER THE CLARKE-M'NARY LAW

The use of controlled fire by a cooperator will disqualify the area in question for Clarke-McNary law

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recognition except in the cases 1 to 3 cited below. These exceptions will be made only when such action is desired by the State forester. The following procedure has been tentatively set up for handling all permitted burning:

The owner should first establish and make known to the State forester his forest land use policy or plan. A written plan will be required by the State forester from the cooperator in every case where he plans to practice controlled burning in a protection unit, showing specifically the owner's reason for burning, subsequent protection desired, frequency of future burning, manner in which all burning will be performed, and location of the area to be burned.

If the plan submitted is approved by the State forester, he will issue a written permit to the owner covering the conditions under which the burning is to be done. No burning shall be done prior to the issuance of the permit. No part of the cost of burning will be paid by the State. The State forester shall, however, take such steps as may be necessary to satisfy himself that the burning is carried through in accordance with the provisions of the permit and in such manner as to safeguard adjoining lands.

In all cases of controlled burning full responsibility for damage must be borne by the owner.

USES OF FIRE WHICH WILL NOT DISQUALIFY AREA FOR FEDERAL COOPERATION

Case 1. Silvicultural burning. Silvicultural burning is here defined as the careful and intelligent use of fire as an aid in the establishment of longleaf reproduction or in the care thereof.

If a cooperating forest-land owner in the longleaf pine type wishes to make use of fire in the management of his forest properties he will first apply to the State forester for a permit, following the procedure outlined above. If the State forester approves the applicant's plan and issues a permit, the burning may be done by the owner without disqualifying the acreage for inclusion within a protection unit. The Federal Government will not share in any part of the cost of silvicultural burning. Even though the desirability from a silvicultural standpoint be established, the Federal Government under section 2 of the Clarke-McNary law would have no legal authority to participate. Subsequent protection would be afforded under the regularly established plan of cooperative protection with the Federal Government participating.

Case 2. Protective burning. This refers to broadcast controlled burning in the longleaf and longleaf-slash pine types as a protective or insurance measure.

Until protection is more fully established, if a cooperating forest owner wishes to burn his land for protective purposes and the State forester approves the plan and issues a permit, as above specified, the area will not necessarily be disqualified for inclusion in the cooperative protective unit on account of such burning.

Case 3. The use of controlled fire on only a portion of the owner's forest-type lands for the purpose of improving game production or grazing values but with complete protection desired for the remaining area. If a cooperating owner desires to have his forest land retained in a cooperative protection unit but wishes to burn parts of the area for special purposes, and if the State desires to issue to him a permit, as outlined above, the unburned area will not be disqualified for inclusion in the cooperative protection unit. The areas burned, however, will be so disqualified unless they are so small and so intermingled with the other land that a practical separation can not be made.

DISQUALIFYING USE OF FIRE

When the owner's policy is to promote a primary land use which is not timber production although timber production is his second management purpose, and when he desires to burn the entire area in order to promote some other activity, such as grazing or quail culture, as the primary use, Federal money cannot be used for protection. The Federal appropriation under section 2 of the Clarke-McNary Act is to promote protection from fire for the purpose of growing timber. Burning for grazing or for quail is not believed to be in accord with best protection and timber-growing practice, and therefore the use of Federal forest fire protection money is not justified.

Where the owner's policy does not contemplate timber growing even as a secondary use, and where he desires to burn to promote the other uses, the area obviously is disqualified for cooperative protection.

An unpermitted burning by an owner will disqualify the land of the owner for cooperative protection.

WOODS FIRES AND GRAZING FOR LIVESTOCK

Experiments conducted at the McNeill, Miss., Experiment Station have indicated that annual winter burning of native range grasses was beneficial to the cattle grazed on such range, under the forest pasture conditions existing at that station and under the methods of livestock management there practiced. The extent to which these results are applicable in other portions of the longleaf belt or under different methods of livestock management has not yet been determined. This is a matter on which widely varying opinions are held by stock owners and others. Until more facts are available on which to base judgment, Forest Service officers will not attempt to pass on the general applicability of the McNeill Experiment Station findings relating to effects of fire on livestock production or as to the desirability or undesirability of woods burning for this purpose. They may properly express their opinions on this point if their advice is directly sought by a landowner who desires to use his land for both livestock and timber production and the desirable treatment for one use seems to be in conflict with desirable treatment for the other. When such requests are received the desirable course will be to consider them with Bureau of Animal Industry officials and, if possible, arrive at a joint answer.

WOODS FIRES AND GAME BIRD PROPAGATION

Studies conducted by H. L. Stoddard have demonstrated that under conditions existing in parts of the southern pine belt, the burning of dry grass, brush, and litter is sometimes desirable for quail propagation but that broadcast or general annual burning is not desirable. (See ch. 15, *The Use and Abuse of Fire on Southern Quail Preserves*, in Mr. Stoddard's book entitled "The Bobwhite Quail.") The position to be taken by Federal forest officers on this subject is stated in case 3 and in the paragraph which follows the treatment of case 3.

EFFECTS OF WOODS FIRES ON EROSION, REGULATION OF STREAMFLOW, AND SOIL IMPROVEMENT

There are no available data to indicate that destruction of forest litter, trees, and other plant growth by fire is not inimical to erosion control and streamflow regulation in the southern pine belt, as elsewhere. Very little data are available, however, by which to measure such damage.

There is likewise little evidence as to the effects of southern woods fires on soil fertility. Studies now under way by the Southern and Appalachian Forest Experiment Stations will be so prosecuted as to supply some of the needed evidence on these subjects at the earliest practicable date. It is not advisable, until such evidence is secured, to discuss erosion due to burning in terms of dollars, or of quantity of soil lost, beyond quoting anything which may be known as to individual areas on which these facts have been determined or applying these facts to other individual areas that are sufficiently similar to warrant a direct comparison.

POLICY ON COOPERATIVE PROTECTION OF DENUDED AREAS

In no southern State are present funds sufficient to provide for the protection of all forest lands that need protection. Therefore, from the standpoint of returns on funds invested, it will be considered of primary importance to have Federal protection funds spent on forest lands that are now restocked or that clearly show the possibility of soon becoming so. This does not mean, however, that there is any change in the position relating to the necessity for state-wide fire prevention educational work or, in some instances, for extensive provision of fire control for such areas.

NEED FOR CONSERVATISM

A large part of the forest-fire damage in the South is a result of intentional burning. Vast effort has been expended in fire prevention educational work, and much progress has been made. In all parts of the South there are stockmen, farmers, and forest-land owners who once favored the use of fire but who are now advocates of complete protection. The various effects of controlled burning of forest lands have not yet been fully demonstrated, and in fact remain largely unknown. A controlled burning policy should not be indorsed or adopted unless, or until, it is well established as a desirable practice in timber growing. Until considerably more is known about the controlled use of fire as a part of timber growing practices, both Federal and State forest officers should be extremely cautious in considering the owners' plans for controlled burning. All forest protection policies must be based upon the effects of fire in the establishment, growth, and proper management of forest stands.

Improvements in Field Telephone Equipment Notable

By W. B. OSBORNE, United States Forest Service

Efforts to develop better field telephone equipment in the Pacific Northwest region have resulted in at least three important improvements. A new portable telephone has been perfected by C. M. Allen, telephone engineer of Region 6 of the Forest Service, which, while costing less than half as much, has about twice the talking and signaling range of the set now in use. Its aluminum shell is made up in two parts, and its mechanism is standard and easily accessible for repair and adjustment.

A new emergency wire having an insulation 400 percent greater than the old cotton-wound wire has been

made up to special Forest Service specifications. It is a stranded, hard-drawn wire, cotton wrapped and covered by a $\frac{1}{44}$ -inch layer of 70 per cent pure latex rubber, with a top braid of cotton impregnated with moisture-proof compound. Ten to 15 miles of this wire can be attached to the main system without undue load, while 3 or 4 miles of the old wire was sometimes prohibitive. The wire weighs 33 pounds per mile, including spools, and has a breaking strength of 65 pounds.

To replace the iron-wire type of model A telephone which weighs about 100 pounds, a new model with a cast aluminum case and weighing only 30 pounds has been designed. Suited to transportation without packing or padding, it is particularly well adapted for use in fire camps.

Disk Device Saves Time in Seeding Nursery Beds

One step of the usual seed-sowing procedure is eliminated by the use of a disking device tried out last year in sowing Norway pine at the Beal Nursery, on the Huron National Forest, Mich. Attached behind the drill, this device adequately covers the seed with sand, making it unnecessary to scatter a layer of sand over the seed bed as has been the practice when a roller was used to press drill-sown seed into the soil. The disks work in pairs, each pair covering a row of seed. They are made of heavy galvanized iron and are about 4 inches in diameter. Old tire-valve stems bored out with a one-fourth inch drill were used as hubs.

In order that the disks might cover the seed evenly, spots of soil that would otherwise have remained rather hard were loosened with a rake before the leveler was used in preparation for the sowing. Because drill spouts often become clogged, especially on areas where roots of trees that have recently been dug remain in the soil, a man walked behind the drill and when there appeared to be danger of such clogging jerked up the drill shoes by means of a chain attached to each end. The ridges of dirt left by the disks were flattened with a roller.

Following this procedure, in 4 hours' time 10 men raked, leveled, sowed, rolled, and treated with acid 16,560 square feet of seed beds. At this rate such a crew can complete a 2-acre sowing job, including putting on the mulch and wire, in about four days.

New Address of Northeastern Station

Having completed its move from Amherst, Mass., the Northeastern Forest Experiment Station of the Forest Service may now be addressed at 335 Prospect Street, New Haven, Conn., where offices and laboratories have been provided by Yale University.

Standards for Timber-Management Plans Are Rising

By HOWARD HOPKINS, United States Forest Service

The first timber-management plan of the United States Forest Service was approved by the Forester in 1920. An inventory of timber-management plans and timber-policy statements approved by the Forester and in effect on January 1, 1932, showed 119 policy statements and 135 management plans. The policy statements covered 99,561,201 acres of the gross national-forest area, or 83,938,606 acres of the net national-forest area; approved management plans covered 25,188,620 acres of the gross and 21,478,919 acres of the net area. The résumé showed that 76 per cent of the 163,854,517-acre gross area of national forests in the United States, and 75.6 per cent of their total net area, is covered by approved timber-management plans or policy statements.

It is estimated that these approved timber-policy statements cover 286,462,688,000 board feet of Government timber and that the timber-management plans control the handling of an additional 96,025,764,000 board feet of national-forest timber.

Most of the approved timber-policy statements and management plans provide for revision at the end of each budget period, usually 10 years. Without such revision the plans and statements would gradually become obsolete, because of changes in policies and the constant increase of knowledge regarding growth and yield of the many species and types on cut-over areas. Plans declared excellent five or more years ago would now, in most cases, be considered unfit for the Forester's approval. A review of the present effective timber plans and statements shows that, despite revisions, just less than 50 per cent (on an area basis) are satisfactory according to present-day standards.

The present inadequacy of the timber plans of 5 or 10 years ago indicates clearly the value of the cut-over cruises, growth studies, etc., so laboriously made by research and administrative men. It is the painstaking daily "grubbing" after facts, sometimes appearing so unending and so useless, that makes it possible to build better management plans and policy statements for the control of national-forest timber.

New Grade Stick for Hardwood Producers

A hardwood grade stick has been devised by the Forest Products Laboratory in collaboration with the National Hardwood Lumber Association to be used as a guide in the production of maximum grades of hardwood lumber by small sawmill operators. Paper charts containing the necessary data, with instructions for pasting on sticks and using, have been prepared for distribution, and a limited number of single copies

can be obtained free upon application to the laboratory at Madison, Wis. If a large number of copies are desired there will be a charge of 5 cents for each copy.

Hardwood lumber is graded on the basis of the proportion of the total surface measure of the board that can be worked up in a definitely limited number of clear-face cuttings, each passing a minimum size requirement. From the stick the number of cuttings permissible for different grades, lengths, and widths can be read directly for all kinds of hardwood lumber except black walnut, poplar, hickory, butternut, rock elm, and mahogany. Although it can not take the place of the technical provisions and full text of the National Hardwood Lumber Association rules and is not sufficient in itself to grade lumber for shipping, it promises to be useful to nonprofessional inspectors and purchasers as well as to operators of small mills.

Crews Collect Cones on the Monongahela

Organized crews were used by the Forest Service in 1930 and 1931 to collect pine cones on the Monongahela Forest, W. Va. In 1931 the men picked an average of 2.19 bushels each per day. With a wage scale of 40 cents per hour for cone pickers and 45 cents per hour for crew leaders, the expense, exclusive of the cost of transporting the men to and from the job, was \$1.22 per bushel of seed collected.

Each member of the crews was supplied with a bucket to which 40 feet of rope was attached, a sack, and a safety belt. The crew leader emptied into the individual pickers' sacks the buckets full of cones that were lowered to him and measured and tallied the quantity of cones picked by each man. The sacks were sewed for shipping and each was tagged to show source, elevation, and collection date. When crews were working close to a road the ground man carried the filled sacks to the road where they could be picked up with a truck. From more isolated places each picker carried in a load at the end of the day, leaving the remainder to be picked up later.

Norway Pine Reproduction Assisted By Disk Harrowing

The difference between 2,000 seedlings per acre and 15,000 seedlings per acre cost only about 75 cents in an experiment carried out by the Lake States Forest Experiment Station with Norway pine on the Chippewa National Forest, Minn. The method used was disk ing with an ordinary farm disk harrow to assist natural reproduction. The area selected for the trial was a 3-acre plot in an old Norway pine stand practically devoid of young tree growth. This was disked in the autumn of 1930 at the time of seed fall. A year later it was found that more than 15,000 one-year-old pine

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seedlings per acre were present on the disked area, while on the adjoining undisked area there were only 2,000 seedlings per acre.

In subsequent tests with known numbers of seed, a year after sowing there was 1 seedling for each 35 seed sown on disked soil and 1 seedling for every 50 seed sown on undisturbed soil. On the disked soil the rate of seedling mortality in the first season was about 20 per cent, while on the undisked soil it was about 50 per cent.

By cutting up the sod and shrubs in the ground the disk lessened the competition of the undergrowth. Seedlings were most numerous in the bottoms of the narrow furrows made by the disk. Evidently the furrows protected the seed from birds and rodents, as well as providing better conditions for germination and survival.

Additional Lands Designated as Experimental Forests and Primitive Areas

Five additional national-forest areas were recently designated by the Forester as experimental forests. The Mount Graham tract, a part of the Crook National Forest in Arizona, includes 3,040 acres of Douglas fir and Engelmann spruce lands that are for the most part typical of the best in the southwestern region. The Swayne Mountain Experimental Forest includes 6,080 acres of the Lassen National Forest, Calif., near Westwood. Here the California Forest Experiment Station will conduct research in methods of timber cutting and slash disposal on 3,000 acres of red and white fir timberland, and will undertake reforestation work on more than 1,000 acres of brush fields. Research and demonstrations will be conducted by the Lake States Forest Experiment Station on three new experimental areas in northern Minnesota which represent the various forest types and conditions found in that region. In the Chippewa National Forest, the Cutfoot tract of 1,335 acres is well stocked, largely with Norway and jack pines, and the Pike Bay experimental area of 1,422 acres contains forests of an aspen-hardwood type, including also a small area of virgin white and Norway pine. The Kawishiwi Experimental Forest, comprising 2,635 acres within the Superior National Forest, contains three important timber types—jack pine, black spruce, and aspen—which are distinct from those found elsewhere in the Lake States region and therefore require special study.

Several new "primitive areas," provided for by the same regulation under which experimental forests are designated, have recently been approved by the Forester. These lands, which will be preserved so far as possible in their present wild state, are all rugged mountain areas, over which travel must be on foot or horseback. Their timber is in most cases too inaccessible to be of commercial value, although it provides watershed protection and aids in regulating stream-

flow. Most of these areas contain high peaks, waterfalls, lakes, and glacial and rock formations of great scenic interest. Wild life is protected. Among the recently approved primitive areas are the following:

In California.—Devil Canyon-Bear Creek, Angeles National Forest, 36,200 acres; San Rafael, Santa Barbara National Forest, 74,990 acres.

In Colorado.—West Elk, Gunnison National Forest, 52,000 acres; Flat Tops, White River National Forest, 117,800 acres; Upper Rio Grande, Rio Grande National Forest, 56,600 acres; Uncompahgre, Uncompahgre National Forest, 68,253 acres; Mount Shavano, Cochetopa National Forest, 32,100 acres; Rawah, Roosevelt National Forest, 25,720 acres.

In Montana.—Absaroka, Absaroka National Forest, 64,000 acres; Spanish Peaks, Gallatin National Forest, 50,000 acres.

In Wyoming.—Cloud Peak, Bighorn National Forest, 94,000 acres; Stratified, Washakie National Forest, 147,000 acres; Glacier Peak, Washakie National Forest, 108,500 acres.

In New Mexico.—Gila, Gila National Forest, 695,296 acres.

Recreational Use of National Forests Grows

Recreational use of the national forests increased in 1931, the estimated total of visitors reaching 32,228,613, a gain of 324,098 over the preceding year. The total includes 496,566 special use permittees and guests, 1,618,460 hotel and resort guests, 2,193,866 campers, and 3,765,025 picnickers. Increased numbers of the latter class of visitors more than offset a decrease in the number of transient tourists from 24,993,591 in 1930 to 24,154,696 in 1931. Travelers to the forests by automobile numbered 29,836,412, a gain of 284,805 over 1930. Railroad and trolley passengers visiting the forests numbered 1,925,237, about the same as in the year before. Hikers increased more than 10 per cent, with 248,970 in 1931 against 220,853 in 1930.

The national forests in California had 17,454,748 visitors, a gain of more than half a million for the year; those in Arizona had 2,818,534 visitors; Colorado, 2,265,071; Oregon, 1,651,573; New Hampshire, 1,563,777; Washington, 1,407,354; Montana, 1,050,243; New Mexico, 1,033,933.



Bamboo rakes have been found very useful in giving the last preparatory touches to seed beds in the Savenac nursery. They remove small stones and débris that ordinary rakes will not touch. The two sizes tried out have a 20-inch and a 15-inch spread, respectively. They are generally procurable at any large hardware store.

General Forest News

Butt Rot in Balsam Fir on Gale River Forest

Butt-rot infection was present in 42 per cent of the merchantable balsam fir, destroying the value of 4.5 per cent of its volume, on areas of the Gale River Experimental Forest examined by Perley Spaulding and G. H. Hepting, of the Bureau of Plant Industry, and H. J. MacAloney, of the Bureau of Entomology. This experimental forest, which is a part of the White Mountain National Forest, N. H., includes about 1,300 acres in the vicinity of Bethlehem, N. H. The plots covered by the study of decays of balsam fir were established within the spruce flat type. On these plots balsam fir about 60 to 70 years old was found interspersed with red spruce. Evidently the stand had come in following early lumbering operations and a subsequent clean burn.

All balsam firs down to 1 inch in diameter at breast height were cut and examined for decay by methods developed and applied in western species by Meinecke, Weir, and Boyce, and in balsam fir in Canada by McCallum. Three decays were found to cause most of the cull: red heart, caused by *Stereum sanguinolentum* (Alb. and Schw.) Fries, occurring in the middle or upper trunk; brown butt rot, caused by *Polyporus balsameus* Pk.; and stringy butt rot, caused by *Poria subacida* Pk. Evidences were found, also, of injury by carpenter ants (*Camponotus herculeanus* Linn.).

The butt rots, through their weakening effect on the tree at the point of greatest strain, had been the direct cause of windthrow of as much as 20 per cent of the total stand of balsam fir on certain areas. Under average conditions, reduction from this cause was 7 per cent. Such reduction was especially marked in dense stands.

Of the total number of trees affected by butt rot 7 per cent had been attacked by both stringy butt rot and brown butt rot, or by ants in addition to one of these types of rot; 76 per cent had been attacked by stringy butt rot only, and 17 per cent by brown butt rot only. Sixty-four per cent of the total butt-rot cull was caused by stringy butt rot, 20 per cent by brown butt rot, and 16 per cent by the two combined or by one of them together with ants. Red heart had attacked 7 per cent of the trees. Carpenter ants had attacked 3 per cent of the trees, their activities alone causing a cull in merchantable volume of 0.3 per cent.

A direct relation was found between age of trees and percentage of trees defective. No decay was found in trees less than 40 years old. The following table shows

the correlation of age with decay in the balsam firs examined:

Age class, in years	Num- ber of trees	Number of trees with butt rot	Number of trees with red heart	Number of trees with ant injury	Total number of defect- ive trees	Percent- age of defective trees
31-40-----	26	0	0	0	0	0.0
41-50-----	37	4	0	0	4	10.8
51-60-----	185	1 57	1 14	3	71	38.4
61-70-----	298	1 128	1 16	1 10	143	48.0
71-80-----	16	9	0	0	9	56.2
Total-----	562	198	30	13	227	-----

¹ Some overlapping is due to occurrence of both butt rot and red heart or ants in the same tree.

No decided difference was noted in susceptibility to decay between fast-growing and slow-growing trees.

Pictures Made With Special Camera Save Time in Spotting Fires

Panoramic photographs that make it a simple matter to determine the location of forest fires are produced with a camera designed by W. B. Osborne, of the Portland, Oreg., office of the Forest Service. This camera has practically all the features of a surveyor's transit, including leveling head, full azimuth circle and vernier, open sight alidade (which may be replaced by a telescopic alidade), high-grade magnetic needle, 1-minute spirit level, and provision for a solar attachment. Among other things this enables the operator to obtain a true meridian and precise orientation from any set-up without recourse to other instruments. Each negative covers an arc of 126 degrees. Its upper and lower margins are automatically graduated in azimuths. At each end is a level line marker and a true vertical angle scale. As soon as the negative is developed a true level line is scratched across its face and the name of the lookout or other station from which the picture was taken is inked in on an end margin.

Given a picture of this character and a very simple printed scale, one can read off the true azimuth and vertical angle to any object shown in the picture and, vice versa, can spot the exact position of any object reported from the station by azimuth and vertical angle.

In making use of such graduated photographs for forest-fire protection, the practice is to obtain a complete set of the pictures from each lookout station and supply each ranger, dispatcher, and fireman with

pictures of the territory within his protective unit. A set of prints is supplied also to each supervisor's or other office that may have occasion to refer to them. When a lookout reports a fire by azimuth and vertical angle the ranger, the dispatcher, and the fireman need only a few seconds to spot the fire on their photographs. A pocket magnifying glass brings out a quantity of topographical detail by which to identify the fire's location and also much detail in regard to factors affecting the rate of spread, such as steepness of slope, aspect, and, in some cases, cover conditions.

American Forestry Association Meets in Baltimore

Conservation of the water resources of the Nation through control of erosion and protection of watersheds was stressed at the annual meeting of the American Forestry Association, held jointly with the Maryland Forestry Association in Baltimore, Md., May 26 and 27. Members of the two associations, foresters, and conservationists from nearly every section of the country heard Arthur M. Hyde, Secretary of Agriculture, discuss The Cost and Cure of Erosion. Other speakers at the various sessions of the meeting, which were presided over respectively by George D. Pratt, president of the American Forestry Association, R. Y. Stuart, Chief of the United States Forest Service, and J. Harris Franklin, president of the Maryland Forestry Association, were: N. G. Grover, United States Geological Survey; Samuel S. Wyer, Fuel-Power-Transportation Educational Foundation; S. B. Show, United States Forest Service, who read a paper by George P. Clements of the Los Angeles Chamber of Commerce; Malcolm Pirnie, American Society of Engineers; Reed W. Bailey, Utah State Agricultural College; E. I. Kotok, United States Forest Service; W. S. Conant, American Engineering Council; Henry O'Malley, Chief of the Bureau of Fisheries; Mrs. John F. Sippel, president of the Federation of Women's Clubs; and Paul G. Redington, Chief of the Biological Survey. Speakers at the banquet on May 26 were Raymond A. Pearson, president of the University of Maryland; Philip W. Ayres, Society for Protection of New Hampshire Forests; and William J. Bulow, United States Senator from North Dakota.

Among several resolutions adopted by the conference was one urging that any national program for unemployment relief appropriations should include plans for the improvement, development, and protection of public forest lands.

During a field trip on May 27, which concluded the meeting, a scion of the Washington elm at Cambridge, Mass., was dedicated in Druid Hill Park by the Daughters of the American Revolution; a walnut tree grown from seed gathered at Mount Vernon was planted by Boy Scouts on the grounds of the new campus of Goucher College, near Baltimore; and visits were made to Patapsco State Forest and Lock Raven State Park.

Water Utilization Studied in Western States

Studies bearing on the effective utilization of water in agriculture are being conducted by the Bureau of Agricultural Engineering with the cooperation of most of the Western States. These "duty-of-water" studies involve investigations as to the quantities of water required for the most economical production of crops, the prevention of waste in applying water to crops, and net irrigation requirements of lands under various physical, climatic, and agricultural conditions.

Studies in southern California have to do with the use of water by both cultivated and wild plants, evaporation from soil and water surfaces, and rainfall penetration into the valley floor. In cooperation with the Bureau of Plant Industry and the Forest Service, studies have been begun to determine the water requirements of tree and shrub growth in canyon bottoms or stream beds. Results so far indicate that the quantities of water economically lost through use by the vegetation on a given area of river bottom in two summer months may equal the annual irrigation requirement of an orange grove of equal area. In many parts of southern California, one region of central California, and certain small areas in Arizona, Colorado, and Utah some work has been done toward conserving surface run-off by spreading it so that it will percolate to the underground water table and be stored there, available for pumping back to the surface when required. Experimental and check plots at the mouth of San Gabriel Canyon in Los Angeles County, Calif., are to be used to obtain data on methods of applying water to percolation areas and particularly on the relative rates of percolation into the ground when the ground has been left in its natural condition, when it has been cleared of vegetation, and when it has been plowed, respectively.

Olson Advises Buying Cones by Weight

"Sackful" is a very inexact expression as applied to quantities of pine cones, and "a bushel of cones" tells little in terms of seed yield, says D. S. Olson, who advocates that nurserymen buy their pine cones by weight. Measuring western white pine cones offered for purchase at the Savenac nursery, Haugan, Mont., Mr. Olson found that gunny sacks supposedly of standard size contained as little as 1.5 bushels and as much as 2.3 bushels of cones apiece, according to the actual size of the sack and according to whether the sack was closed by sewing or by tying. When he weighed sackfuls of cones he found even greater differences, governed largely by the degree to which the cones had expanded as a result of drying. Sackfuls varied from 315 tight cones weighing 56.62 pounds to 60 dried cones weighing 6.65 pounds.

West Coast Lumbermen's Association to Carry On

In spite of a recommendation by the trustees that the organization be abandoned because of the decreasing membership and nonpayment of dues, stockholders of the West Coast Lumbermen's Association at a meeting in Tacoma, Wash., on May 31 decided to continue minimum essential activities at least until September 1, 1932. In the meantime the association will endeavor to secure the support of mills representing 80 per cent of the production of the lumber industry in the Northwest. Drastic reductions in dues were made, the rate per thousand board feet on shipments of logs and lumber being decreased from 10 cents to 3 cents for combined mill and logging units, and from 5 cents to 1½ cents for individual lumber manufacturers and independent loggers. These low dues, W. B. Greeley, secretary-manager of the association, believes, will aid in attaining the necessary increase in membership. The activities which will be maintained include mill inspection, supervision of members' grades, issuance of certificates, grade marking, traffic work, and statistics.

Ants and Rodents Aid in Control of Mountain Pine Beetle

By H. J. RUST, United States Bureau of Entomology

Success of the bark-peeling method of controlling attacks of the mountain pine beetle is assured where ants, centipedes, and small rodents are present, but where the immature insects are protected from these predacious enemies they may develop and attack the trees. These conclusions were reached as the result of extensive experiments conducted after the discovery in 1927 that a certain percentage of exposed, immature barkbeetles of this species could mature in the duff. The peeling method of control, based on the assumption that the removal of the bark from infested trees while the barkbeetle broods were in the larval or pupal stage between the bark and the wood would result in their death through exposure and lack of food, had been in use since 1905. Studies were made to test the effectiveness of the method as practiced against outbreaks of the mountain pine beetle in lodgepole and white pines.

In making the tests to determine the degree of survival of mountain pine beetle broods in different stages of development when exposed in the duff but protected from predacious enemies, undeveloped broods were placed in wire-screen cages constructed around the base of green, standing trees. When thus protected, prepupal larvæ, pupæ, and new adults of the beetle matured and successfully attacked healthy trees.

To determine the survival of unprotected insect broods, observations were made on a large number of

plots established at or near recently treated logs on which insects were placed. In open stands of lodgepole pine on the Bitterroot National Forest, Mont., ants and centipedes destroyed the exposed broods in a very few days, the ants being active on the south, east, and west exposures, and the centipedes on the mossy north slopes. In the denser white pine stands of the Coeur d'Alene, Clearwater, and Kaniksu National Forests in Idaho and Washington, small rodents, such as mice, shrews, voles, and chipmunks, in addition to the ant population, were instrumental in destroying the exposed broods. Practically all of the newly formed adults were destroyed, but the mature adults escaped by flight or by boring into pieces of bark lying on the ground.

A number of rodents were captured on the plots and placed in captivity. These captives were fed daily with varying numbers of mountain pine beetle larvæ, pupæ, and new adults. A chipmunk consumed 250 insects daily; a white-footed mouse, 559; a shrew, 500; a vole, 345; and a female white-footed mouse with five young, 1,277.

It may be safely assumed that in all white pine stands sufficient numbers of these enemies of the mountain pine beetle are present to make the peeling method of control successful, particularly during the larval and pupal stages of the insect.

Americans Advised to Test *Pinus Peuce*

Foresters in all the white pine regions of the United States should make experimental plantings of Macedonian pine (*Pinus peuce*), in the belief of S. B. Detwiler, Chief of the Blister Rust Control Division, Bureau of Plant Industry. Observations on its growth in Europe indicate that this pine may have value in the United States as a partial substitute for the native white pines because of its apparent immunity to the white pine blister rust. Some planting stock of the species will soon be available from seed sown by the bureau in 1929 and 1931, and additional test plantings are to be made with seed supplied by Karl M. Müller, of Munich, Bavaria.

Doctor Müller, who was engaged by the Bavarian State forest administration in 1926 to make a study of Macedonian pine within its natural range in the Balkans and report observations bearing on its cultivation, states that the climate in which the tree occurs naturally is very similar, in general, to that of the western United States. The pure, even-aged *Pinus peuce* type ranges in the Rila Mountains between 5,600 and 7,300 feet elevation, and in mixure the tree occurs at elevations down to 4,000 feet. At high elevations the best growth occurs on steep, cool, shady slopes, owing to a need of protection against direct sunlight. In its natural range the pine grows almost exclusively on silicate rocks, but it is cultivated successfully on other mineral soil.

Although not very deep rooted, Macedonian pine is very seldom wind thrown. The elasticity of the wood is such that snow damage does not occur. In tolerance of shade Macedonian pine is about equal to northern white pine. In the Balkans it can be considered moderately fast growing. Examination of numerous sample trees showed that height reached 40 inches in an average of 11.5 years, 60 inches in 14 years, and 80 inches in 16.3 years. For trees cultivated at lower levels the growth in height lags very little, if at all, behind that of northern white pine.

In its native range Macedonian pine is classed by foresters as the conifer least affected by insects and fungous diseases. It is a first-class timber species, not inferior in height growth to Scotch pine (*Pinus sylvestris*) or white fir (*Abies pectinata*). Usually at an age of 200 years and at elevations up to 6,600 feet it ranges from 90 to 120 feet in height and from 16 to 24 inches in diameter at breast height. The wood is heavier than spruce (*Picea excelsa*) and white fir and only a little lighter than Scotch pine. In durability it exceeds white fir and spruce and nearly equals Scotch pine.

The tree begins to bear seed at the age of 17 to 20 years on shady, cool slopes, and at 12 years in hot, dry localities. Heavy cone crops occur every three or four years. A strong turpentine taste repels browsing animals.

At Grafrath, near Munich, Macedonian pines planted about 23 years ago by Heinrich Mayr have reached average heights of 20 to 25 feet and average breast-height diameters between 3.6 and 5.6 inches, with maximum height about 27 to 30 feet and maximum diameter between 4.4 and 6.6 inches. "There is no doubt," writes Doctor Müller, "that this young stand of Macedonian pine at 1,600 feet elevation is growing better than the original second growth at 6,000 feet elevation and more than 6° farther north. There is not very much difference between *Pinus peuce* and *Pinus strobus* in the same locality and under equal conditions."

A characteristic that complicates the growing of *Pinus peuce* in the nursery is very slow germination. The seeds are heavy—100 seeds weigh 3.95 grams—and germination is delayed for one or two years. Experiments have not been made to determine whether germination can be hastened by storing the seed at very low temperatures.

Mr. Detwiler comments on Doctor Müller's suggestions as follows:

Our northern white, western white, and sugar pines are the cream of the United States forest species, and it is more reasonable and practicable to apply local control to protect these splendid native stands than to plant an exotic species in their places, especially since on most sites the cost of such protection is less than that of planting.

Five-leaved pines now form natural stands over millions of acres. Even if only the very best of the present 5-leaved pine sites in the United States are

considered, a total of more than 20,000,000 acres is involved. Forestry is not yet sufficiently developed in America to permit us to consider replacement of the white pines through planting on the tremendous scale which would be required. This is shown by our experience with the forests destroyed by chestnut blight; practically no attempt has been made to replace them through planting. We believe that foresters in all the white pine regions should make experimental plantings of *P. peuce*, to ascertain the growth and yield of this species under the various conditions of climate and soil and test its freedom from rust. It will take an entire forest rotation to answer these questions, but if Macedonian pine succeeds well during the early years of trial we should be justified in advocating large-scale experimental planting.

World-wide history of attempts to use exotic forest species to replace native species shows that the odds against exotics are great. Obviously, we can regard the Macedonian pine only as a hopeful possibility. In Germany the commercial white pine species are all exotic, and under these conditions there is little difficulty in substituting *P. peuce* for *P. strobus*. With our millions of acres of natural 5-leaved pine forests, our situation is entirely different from Germany's. However, forest planting in the United States is gradually increasing, and no time should be lost in determining the value of Macedonian pine for such use.

Sunspots and Forest Fires

"Sunspot indications justify extra precautions to safeguard forests against fire," declares Ralph E. DeLury of the Dominion Observatory, Ottawa, in the Canadian monthly, Forest and Outdoors. Canadian records show that forest fires have been abnormally frequent and devastating during sunspot minimum years. That the next sunspot minimum, due in the latter part of 1934 according to the 11.2-year average cycle, will arrive earlier seems to be indicated by the fact that sunspots have already become very scarce in the past few months. It is probable, therefore, that the next three or four years will bring increasing summer temperatures and lightning storms, both conditions tending to increase the forest-fire hazard.

Records at Toronto of temperatures and number of thunderstorms from 1873 to 1925, when compared with the sunspot cycles for the same period, show an average temperature 1.4° F. higher, with 33 per cent more thunderstorms, at sunspot minimum than at sunspot maximum periods. Stations in Alberta show temperatures 3° to 4° higher at sunspot minimum. Mr. DeLury explains:

At sunspot maximum nearly double the amount of ultra-violet light reaches the earth than at sunspot minimum. Ultra-violet light ionizes the terrestrial atmosphere, promoting the formation of gaseous compounds and inducing greater haziness and cloudiness at sunspot maximum. Therefore at sunspot minimum more solar radiation reaches the surface of the earth, stimulating convection, evaporation, and electrical storms, thus tending to increase the fire hazard.

In the case of precipitation, the response to the sunspot cycle is more varied. Oceanic regions, as

represented by St. John's, Newfoundland, have greater precipitation at sunspot maximum, when temperatures are lower; in inland regions, as represented by Montreal, there is greater precipitation at sunspot minimum when temperatures are higher. The same distinction is shown in the yearly trend of precipitation, which is greater at the ocean in the cold months and greater for inland regions in the hot months. Intermediate regions share in the oceanic and inland reactions, exhibiting two pulses in the sunspot cycle, or in other words a half sunspot cycle. The increased rainfall in the interior of Canada at sunspot minimum compensates somewhat for the higher fire hazard resulting from increased temperatures, evaporation, and lightning during that period.

Protecting Turpentined Timber From Insect and Fungus Injury

Prevention of insect and fungus damage to turpentined timber through dry or burned faces has been the object of experiments by Haynes Huggins, woods superintendent of a southern Alabama lumber company. Mr. Huggins believes that wood which is sealed over by a coating of gum is safe from attack by insects or fungi. It is known that the turpentine beetle, for example, will not attack fresh faces, concentrating its work on exposed wood. Three or four new streaks on the face will usually result in a sufficient flow of resin to provide effective protection until the tree is cut.

Foreign Notes

Redwood Growth in Southwestern France

A group of redwood trees planted in France in 1856, reputedly at the suggestion of Empress Eugénie, at a spot bordered by the road from Laruns to Eaux-Bonnes, is pointed out as demonstrating the adaptability of the species to conditions existing in western and southwestern France. Of the 14 trees remaining after a large number were felled in connection with the widening of the road, the largest were reported in 1931 by Assistant Inspector Sannac of the administration of forests and waters to have attained the following dimensions: 1 tree, 3.75 meters in circumference (at a height of 1.3 meters) and 19 meters in height; 3 trees, 3.5 meters in circumference and 21 meters in height; 1 tree, 3.45 meters in circumference and 18 meters in height; 1 tree, 3.15 meters in circumference and 17 meters in height; and 1 tree, 3.15 meters in circumference and 15 meters in height.

Forestry Courses for Norwegian Army Recruits

A forestry course for army recruits was instituted in Norway this spring when 100 men and 7 noncommissioned officers under the direction of Capt. J. Dugstad, who had studied this type of work as conducted by the French Army, began 48 days of work in theoretical and practical forestry combined with military training. The Norsk Skogselskap (Norwegian Forest Co.) of Oslo, a semiofficial organization maintained partly by private contributions and partly by funds raised through Government lotteries, financed the undertaking except for the equipment and clothes of the recruits, which were to be furnished by the Norwegian Army.

Most of the young men enrolled in the course were from western Norway where forests are not so common as in the eastern sections of the country, and it was the hope that upon returning to their homes they would put into practice what they had learned of forestry. It was planned to have them plant 150,000 trees during the course.

If this experiment turns out to be a success, a larger number of the 4,000 recruits who undergo special training for a few weeks each year under army supervision will probably be assigned to the forestry course.

Swiss Forester Discusses Interrelation Between Forests and Rainfall

Do forests increase atmospheric precipitation, or are they the result rather than the cause of abundant rainfall? M. Moreillon writing in the *Journal Forestier Suisse*², gives data on both sides of this much-discussed question, and reaches conclusions which he designates as "a contribution to research on the relation which may exist between rainfall and the density of forest cover of a region."

Records are not lacking that can be interpreted as proof of the theory that the existence of forests increases the amount of rainfall. The Forest School of Nancy, France, established rain gages in three places near that city in 1867 and kept records of the amount of rainfall for 33 years. The greatest amount of rain fell at the first station, which was situated in the midst of a forest; at the second station, several hundred meters from the border of the forest, the rainfall was 93.7 per

² Moreillon, M.: *Pluviosité et Taux de Boisement du Plateau Suisse*. *Journal Forestier Suisse*, January, 1932, pp. 13-19.

cent as much; at the third, which was in cleared agricultural land, it was only 76.7 per cent of that at the forest station.

Other records, however, have shown that in entirely similar stations in the same locality noticeable differences in amount of rainfall may occur for no accountable reason. Theories as to the cause of augmented rainfall where there are forests are that friction diminishes the velocity of air currents as they pass over a forest and causes an ascending movement which favors condensation of atmospheric vapor; and that warm, damp air is subjected to a cooling influence when passing over forests, which causes precipitation. There are many other theories of the causal relationship between forest cover and rainfall. But, in Switzerland at least, to which this study is confined, precipitation must depend to some extent on altitude, since there is abundant rainfall above the timber line, where the presence of forests on the lower slopes has no influence.

The data on which M. Moreillon's conclusions are based were obtained from observations recorded at 28 stations in the Swiss Plateau region, at altitudes between 400 and 900 meters, during the years 1901-1920. Complete records were kept over this period of the amount of precipitation, number of days with more than 1 mm of rainfall, average precipitation per day, and density of forest cover at each point; these factors were studied to ascertain whether there was any constant interrelation between them. The conclusions are:

1. Rainfall increases with altitude and not with degree of forest cover.
2. Density of forest cover depends on several factors, of which the most important are climate, physiography, geology, and economic conditions.

Finland's Older Forest Industries

As Finland's great forest industry the present-day production of paper and wood pulp was preceded three centuries ago by the production of tar. The tar was burned from young pine trees. E. E. Kaila writes of this old-time industry as follows:

When the power of the Hansa had been broken early in the sixteenth century and trade was started between Finland and Holland, England, and other countries, such products began to be exported directly from Finland or else via Sweden—to which Finland was united up to 1809—as were required in the countries surrounding the North Sea on account of their large and constantly growing shipping and as could easily and cheaply be prepared in Finland: Tar and wood goods, planks for shipbuilding, etc. There were almost unlimited quantities of these in the Finnish forests. Formerly the forests of Finland had been used almost exclusively for crop burning, by means of which the country obtained its grain.

Tar in particular became a very important article of export from Finland, as it was not prepared in the rest of the world nearly so cheaply, nor in such quantities, as in Finland. In the days of the greatness of wooden ships Finnish tar shone on the sides of the mighty frigates of Drake, Van Tromp, Ruyter, and Nelson.

In the trade of Finland in 1640, for instance, half of the exports consisted of tar. At that time tar was burned to some extent here and there in the forests growing in other countries, Norway, Poland, Archangel in Russia, and Virginia, and a little in north Sweden, but only on a fairly small scale compared with Finland.

The three principal methods of utilizing the forests of Finland were not the same throughout the country, because of the weight of the products. The cheap products would not stand long transport by land. Until the time of railway construction Finland was handicapped by difficulties of transportation and accordingly the country was divided from the interior to the coast into three main zones of production as regards forest products. The cheapest products, such as wood goods (boards, planks, wood, etc.), were confined on account of their weight to the coastal district. This zone was about 20 to 30 kilometers wide. Beyond it the zone of tar burning began; the tar was, in relation to its weight, considerably of higher value than wood goods. But as transportation from the interior parts of south Finland had to proceed over hilly ground, the tar was not usually transported to the coast from the interior of south Finland, nor was it prepared there except in some cases for household requirements.

Before 1721 tar was burned on a large scale in east Finland, Savo, and Karjala, as the route across the lakes was very cheap for transporting tar barrels by water to the vicinity of the port of Viipuri. But when Viipuri and its surrounding district became part of the Russian Empire, the transport of tar by boat from Savo and Karjala ceased and tar burning in the whole of east Finland also came to an end.

The zone of crop burning was furthest from the coast; its product, grain, which was the most valuable in relation to weight of the products prepared in Finland, used to be transported by horses, especially during the period of snowroads, from the interior to the towns on the coast for sale across the whole of Finland. Crop burnings were, of course, made partly in order to obtain home-grown bread in the districts of the tar-burning zone.

With the development of economic life and traffic the crop burnings fell off in Finland in the middle of the nineteenth century; the trees, the forests grew in value, then tar burning fell off and the building of wooden ships also. A different method of preparing wood goods for the sawmill industry was started by making use of the rapids to a greater extent, and lately the paper and wood-pulp industry has taken its place in Finnish production and national economy as a fourth method of exploiting the forests.



No protection from Government sources will be available to privately owned or leased timberlands in British Columbia for the fiscal year April 1, 1932, to March 31, 1933. The "Forest Protection Fund," made up of contributions from the Government and the private timber holders, has been suspended for that period by the Provincial Government.



Gales in Europe were so severe last winter than Sweden alone is said to have had 3,000,000 forest trees wind thrown.

Personals

James W. Toumey, professor of silviculture at Yale University, died suddenly on May 6, 1932, at New Haven. For 32 years Professor Toumey was associated with the Yale School of Forestry, holding positions ranging from assistant professor of forestry to dean of the school. A graduate of Michigan State College in 1889, Professor Toumey spent two years there as assistant in the department of botany, then for eight years was at the University of Arizona, advancing there from assistant professor of biology to professor of botany and director of the Arizona Agricultural Experiment Station. He was in the United States Forest Service from 1899 to 1900, when he was called to Yale. His approach to forestry being from the botanical side, his chief interests were in dendrology and silviculture. Since 1922, when he retired as dean of the Yale Forest School, he devoted his time chiefly to research, the development of graduate study, and building up the Yale Forest at Keene, N. H. A personal herbarium of 2,500 specimens of American trees and shrubs was presented by him to Yale. He held the honorary degrees of doctor of science from Syracuse University and doctor of forestry from Michigan State College. He was the author of a number of scientific bulletins and of two widely used forestry textbooks, *Seeding and Planting in the Practice of Forestry*, published in 1916 and revised in 1931 with C. F. Korstian as co-author, and *Foundations of Silviculture*, which appeared in 1929. One of the leaders in forestry from its early days, Professor Toumey has had a profound and lasting influence on the profession.

Senator W. F. George of Georgia has been appointed a member of the National Forest Reservation Commission to fill the vacancy created by the death of Senator W. J. Harris.

Officers elected for the coming year at the May meeting of the Washington section of the Society of American Foresters are J. P. Kinney, director of forestry of the Indian Service, United States Department of the Interior, chairman; A. E. Fivas, of the Office of Blister Rust Control, Bureau of Plant Industry, United States Department of Agriculture, vice chairman; Perkins Coville, of the United States Forest Service, secretary.

W. M. Beveridge, junior forester on the Lincoln National Forest, N. Mex., has been transferred to the Southwestern Forest and Range Experiment Station at Tucson, Ariz. Mr. Beveridge will be assigned to range management investigations in the ponderosa pine type of the Coconino Plateau.

Samuel J. Record, professor of forest products at Yale University, has been elected secretary-treasurer of the International Association of Wood Anatomists. The purpose of this association, which was organized in Paris last July in conformity with resolutions adopted by wood anatomists attending the Fifth International Botanical Congress at Cambridge, England, in 1930, is to cooperate in a systematic investigation of the woods of the entire world through the pooling of materials, standardization of terminology and descriptions, and the exploration of little-known forest regions. Fifty scientists in eighteen different countries comprise the present membership. Eleven members of eight nationalities form the executive council, on which are two Americans—Professor Record and Irving W. Bailey, professor at Harvard University.

Herbert Dreher, of Owosso, Mich., has recently been elected executive secretary of the Michigan Forestry Association. Mr. Dreher is also chairman of the reforestation committee of the Owosso Chamber of Commerce. Other officers elected by the association are J. C. DeCamp, director of forestry and conservation of the Hiawatha Sportsman's Club, Lansing, Mich., president; George M. Ames, Grand Rapids, vice president; and Robert Craig, jr., of the department of forestry, University of Michigan, Ann Arbor, treasurer.

Percy M. Barr, assistant forester in charge of the research division of the department of lands in British Columbia, has returned to Victoria after spending a semester at the University of California teaching forest mensuration.

A. B. Hatch has resigned his position as assistant silviculturist at the Allegheny Forest Experiment Station to accept a scholarship at Harvard University. Mr. Hatch will continue his studies on mycorrhizæ at Harvard, doing most of the work under a cooperative arrangement with the Boyce Thompson Institute of Yonkers, N. Y.

W. A. Robertson, conservator of forests in Rangoon, India, from 1924 to 1931, has been appointed editor of the Empire Forestry Journal, published semiannually in London, upon the resignation of Fraser Story, who has filled the position for the past nine years.

Ralph H. Johnson, planting assistant on the Huron National Forest, Mich., has been transferred to the Chippewa National Forest in Minnesota, where he will take charge of the nursery, planting, and seed-extraction operations.

Charles H. Herty, inventor of the Herty cup and well known for other work in connection with naval stores, has been awarded a medal by the American Institute of Chemists for "noteworthy and outstanding service to the science and profession of chemistry in America." Doctor Herty is now working on the problem of successfully producing paper pulp from slash pine.

W. C. McCormick, membership director of the American Forestry Association, has accepted the position of secretary of the Florida Forestry Association. Mr. McCormick plans to conduct educational work in Florida along the lines of the southern forestry educational project of the American Forestry Association, of which he was regional director during its 3-year campaign ended in 1931.

Henry E. Clepper has recently been transferred from the Pennsylvania Forest Research Institute to the Bureau of Forest Research and Information of the Pennsylvania Department of Forests and Waters at Harrisburg, Pa.

H. L. Henderson, assistant professor of forest utilization at the New York State College of Forestry, will make a study of wood-using industries during a period of sabbatic leave. He will also visit national forests, forest schools, and logging operations in New England and the South. Professor Henderson is preparing a textbook on Air Seasoning and Air Drying.

R. S. Campbell and C. J. Whitfield, of the Southwestern Forest and Range Experiment Station, each received the degree of doctor of philosophy from the University of Chicago June 14.

Laurie D. Cox, recently appointed head of the department of forest recreation and park engineering at New York State College of Forestry from the position of professor of landscape engineering at the same college, has been awarded the degree of doctor of science by Acadia University, Nova Scotia, from which he received his A. B. degree in 1903. Professor Cox was also graduated from the professional school of landscape architecture at Harvard University in 1908.

Officers elected by the Botanical Society of New Orleans for the year 1932-33 are L. J. Pessin, of the Southern Forest Experiment Station, president; Anna Haas, of Newcomb College, vice president; Philip C. Wakeley, Southern Forest Experiment Station, secretary; and Paul V. Siggers, Bureau of Plant Industry, treasurer.

Thomas M. Talbott, fire law enforcement officer, has been transferred from the Region 6 office of the Forest Service at Portland, Oreg., to the California region, where he will have charge of enforcement work in the northern part of the State, with headquarters at Yreka, Calif.

Louis E. Wise, who recently resigned as head of the department of forest chemistry at the New York State College of Forestry, Syracuse University, on account of illness, has been appointed professor emeritus of forest chemistry. Clarence E. Libby, for 12 years professor of pulp and paper manufacture at the college, succeeds Doctor Wise, with the title of head of the department of pulp and paper manufacture. Floyd E. Peterson, instructor in pulp and paper manufacture, has been promoted to the position of assistant professor of forest chemistry.

Bibliography

The World's Softwood Lumber Situation

By W. N. SPARHAWK, United States Forest Service

On the basis of recent world production and trade in softwood lumber, Professor Streiffert, of the College of Forestry, Stockholm,³ concludes that the prospect of a continued steady increase in the world's demand for sawn lumber is less obvious than it used to be. Somewhat optimistically he asserts that the adoption of rational forestry methods has already largely increased the available supply of timber, and that it may never be necessary to exploit the more remote

forests of the world. For these reasons he does not anticipate that softwood lumber prices will ever rise substantially above the general level of commodity prices.

So far as the present depression is concerned, the author observes that lumber has shown a greater degree of adaptability to the diminished demand than perhaps any other staple article. Since the beginning of 1929 unsold lumber stocks in Sweden and Finland have declined approximately 32 per cent, in spite of a heavy decrease in exports. It is a little surprising to read that the tendency to maintain production at a sacrifice of profits or at a loss is less strong in the sawmill industry than in other staple industries, and that the reluctance of forest owners to sell their timber at low prices has directly contributed to the recent decline in production.

³ Streiffert, Thorsten: *The World's Staples. XI. Sawn Woodgoods. Index* (Svenska Handelsbanken, Stockholm), vol. 7, no. 75, pp. 62-85. 1932.

International trade in softwood lumber amounted to 12,500,000,000 board feet in 1913, increased to 15,000,000,000 feet a year in 1927-1929, and declined to 10,000,000,000 feet in 1931. For four years (1926-1929) the exports from Europe as a whole were slightly more than the imports; before 1926 and since 1929 Europe, including Russia, has imported more softwood than she has exported to other continents.

Although Russia was the only country to increase her lumber exports substantially in 1930, there was no further increase in 1931 and a decline is in prospect for 1932. Professor Streiffert believes that Russian exports are more likely to decrease than to increase during the next few years.

American Arboreta and Botanical Gardens

By W. A. DAYTON, United States Forest Service

There has recently been published by the American Association of Nurserymen (Inc.) a 25-page Report of the Committee on Botanical Gardens and Arboreta. This committee stresses the need of arboreta and botanical gardens and states that, for nurserymen, such institutions represent a necessary and authentic "museum, library, and laboratory," occupying a place in the horticultural world somewhat analogous to that of the Bureau of Standards in the mechanical and industrial arts. The pamphlet gives a list of 85 arboreta and botanical gardens, by States, indicating their names, locations, and directors' names; also a supplement, giving a synopsis of the work being conducted at each of 42 of these institutions. It is an invaluable reference work.

Slash Disposal and Forest Fire-Weather

By PAUL W. STICKEL, United States Forest Service

Settlers' slash, or "flat abatis," which creates a serious forest-fire hazard in colonization districts in the Province of Quebec, is discussed in relation to disposal methods under various meteorological conditions by L. H. Nichols in the fourth of a series of reports to the Quebec Forest Industries Association (Ltd.).⁴ Among the settlers in Quebec it is the custom after utilizing all the merchantable timber on their land to cut down the remaining trees and bushes and leave the tangled mass on the ground to dry out for several months. Where such slash-covered areas, which are often of 20 acres or more, are contiguous to the green timberlands of pulp and lumber companies they are viewed with concern by limit holders. The abatis burns rapidly when ignited, consuming all the inflammable materials

on the area, and, although observations show that the fire seldom spreads into green timber to any considerable depth, under certain conditions such slash burnings have been the cause of many serious past conflagrations.

In order to determine under what weather and fuel-moisture conditions the removal of slash incident to the clearing of land for agricultural purposes can be carried on without danger to adjacent timber, Nichols investigated the inflammability of the forests contiguous to large areas of flat abatis which were burned at various degrees of dryness and under different meteorological conditions. The field work was conducted on the south shore of the lower St. Lawrence in the mixed spruce-hardwood forest type. In addition to match inflammability tests made on the duff prior to igniting the slash, measurements were made of relative humidity, wind velocity, and moisture content of the top three-fourths inch of the duff layer. These data, supplemented with similar information from forest fire-weather stations maintained from 1928 to 1931, inclusive, form the basis of Nichols' conclusions and recommendations.

Conditions were favorable to the indefinite spread of combustion in the duff layer of green timber at only 13 fires observed. Considerable differences in weather and fuel-moisture conditions were noted at these fires. The duff moisture content varied from 11 to 100 per cent; relative humidity from 28 to 54 per cent; and wind velocity from calm to 20 miles per hour. Despite these wide differences, Nichols found the data sufficiently significant for the construction of a fire-hazard graph. Wind velocity is the controlling factor; the variations in relative humidity and duff moisture content which will allow slash fires to spread into green timber are shown for three wind velocities, thus:

Wind (miles per hour)	Relative humidity (per cent)	Duff moisture content (per cent)
0.....	54 or less.....	56 or less.....
10.....	58 or less.....	67 or less.....
20.....	60 or less.....	105 or less.....

Based upon the author's experience and the facts presented above, it is recommended that abatis fires be set only under the following conditions: Wind velocity less than 10 miles per hour, relative humidity not lower than 40 per cent and likely to increase (as in the late afternoon or prior to showers), and duff moisture content more than 70 per cent. When the duff contains as low as 40 per cent moisture, fires may be set provided wind does not exceed 10 miles per hour, and relative humidity is more than 60 per cent.

Nichols' report is an important contribution to forest fire-weather literature for two reasons. It brings to the fore the part played by wind in affecting the ability of fire to spread. Save for Show's earlier conclusions

⁴ Nichols, L. H.: The Burning of Settlers' Slash and Meteorological Conditions in the Province of Quebec During 1931. 38 pp., including 5 plates and 15 tables. Quebec Forest Industries Association (Ltd.), 1931. Mimeographed.

on this point,⁵ no other data have been available up to the present. Furthermore, the results obtained from the abatis-burning investigation are a practical test of the principles discovered at fire-weather stations. The information obtained from these two methods of fire research are so nearly alike that Nichols believes just as useful results can be obtained from small-scale experimental burnings using different fire brands at fire-weather stations as from the more expensive, arduous, and even dangerous experiments with slash fires.

International Address Book of Botanists

By W. A. DAYTON, United States Forest Service

An international address book of botanists, prepared in accordance with a resolution passed at the Fifth International Botanical Congress at Cambridge, England, 1930, has now issued from press, and can be obtained from the publishers, Messrs. Baillière, Tindall, and Cox, 7 and 8 Henrietta Street, Covent Garden, London, WC 2, England, for 17 s., 1 d. (\$3.25). The book lists the botanical institutions of the world, and names about 10,500 botanists.

The polyglot character of the congress itself is partially reflected in the trilingual (English, French, and German) preface, index of countries, and country headings in the main body of the book. The bulk of the book is taken up with the alphabetical list, under countries also alphabetically arranged, of botanical institutions and botanists. The names of the botanists are given in boldface, followed by the degree or degrees, official position and address, and (in parentheses) most active botanical interests. The States in the United States are not separated, but Alaska, the Hawaiian Islands, and the Philippines are treated individually. Puerto Rico is included in the West Indies and Guam in the Marianne Islands. A 4-column, 37-page index of names concludes the work.

The book contains 605 pages. It is neatly bound in red linen.



"A Manual on the Commercial Timbers of British India," by R. S. Pearson and H. P. Brown, in two volumes containing 1,132 pages of text and 640 pages of illustrations, is now in press as the result of the decision of the government of India to bring all available information on this subject up to date. The manual deals with 320 tree species for each of which are given nomenclature and references, information on distribution and supplies, a full description of the structure of the timber, mechanical and seasoning properties, durability, working qualities, and present and prospective uses.

⁵ Show, S. B.: Climate and Forest Fires in Northern California. Jour. Forestry 17:965-979, illus. 1919.

Denmark Publishes Forestry Bibliography

Denmark has published a comprehensive bibliography of its forestry literature from the beginning through 1925. The bibliography was compiled by A. Opperman, late director of the Danish Forest Experiment Station, and V. Grundtvig, chief librarian of the state library in Aarhus. Together with publications printed within the frontiers of the present Denmark it includes publications written by Danes but printed in other countries and publications of foreign authorship dealing with Denmark. The compilers endeavored to list, so far as possible, all works having a lasting scientific, administrative, or historical value. In cases of doubt they "followed a rule appropriate to a small country: include too much rather than too little." The titles listed number 4,718. Each Danish title is followed by a brief German annotation indicating the nature of the publication's contents.

The bibliography occupies 290 pages. An introduction explains, in Danish, German, English, and French, the purpose of the work and the plan on which the compilers proceeded.

By publishing this book in 1931 Denmark has won the honor of being the first nation to produce its volume of the *Bibliographia Universalis Silviculturæ* that has for many years been a project of the body now known as the International Union of Forest Research Organizations. Originally suggested by Philipp Flury, of Switzerland, in 1903, the compilation of such a bibliography was agreed upon in 1906. A committee appointed at that time devoted considerable effort to collecting the older forestry literature with the intention to issue a general European forestry bibliography on a periodic basis. This work was interrupted by the World War and has but recently been taken up individually by nations represented in the International Union of Forest Research Organizations.

Recent Books and Pamphlets

- Barrington, A. H. M.: Forest soil and vegetation in the Hlaing forest circle, Burma. 95 pp. (Burma Forest Department. Bulletin no. 25.) Rangoon, 1931.
- Barron, N. T.: Forest planting in South Carolina. 16 pp. illus. South Carolina Forest Service, Columbia, S. C., 1931.
- Chalk, L., and others: Some East African coniferae and leguminosæ. 68 pp. illus. (University of Oxford, Imperial Forestry Institute. Forest trees and timbers of the British Empire, 1.) Oxford, England 1932.
- Chambers, E. L., and Thompson, N. F.: Some of the more important insects and plant diseases of Wisconsin trees and shrubs. 58 pp. illus. (Wisconsin Department of Agriculture and Markets bulletin no. 123.) Madison, Wis., 1931.

- Champion, H. G., and Pant, B. D.: Notes on *Pinus longifolia* Roxb.: the plantations in Dehra Dun and the Central Provinces, and miscellaneous seed studies. 25 pp. pl. (Indian forest records, vol. 16, pt. 7.) Calcutta, 1932.
- Collardet, J.: Nos bois coloniaux: étude physique et mécanique des bois coloniaux. 132 pp. Association Colonies-Sciences, etc., Paris, 1930.
- Finska Forstsamfundet. Acta forestalia fennica, 37. 493 pp. illus., pl., map. Helsinki, 1931.
- France, École Nationale des Eaux et Forêts: Annales, tome 4, fascicule 1. 221 pp. pl. Nancy, 1931.
- Gamble's International Naval Stores Year Book for 1931-32. 96 pp. illus. Thos. Gamble, Savannah, Ga., 1931.
- Great Britain Colonial Office: The training of candidates and probationers for appointment as forest officers in the Government service. 55 pp. London, 1931.
- Herr, C. S.: Maple syrup and sugar production in New Hampshire. 16 pp. illus. (University of New Hampshire Extension Service circular 135.) Durham, N. H., 1932.
- Lavauden, L.: Le problème forestier colonial. 49 pp. pl., maps. Berger-Levrault, Paris, 1931.
- National Shade Tree Conference, seventh: Proceedings of annual meeting, 1931. 148 pp. New Haven, Conn., 1931.
- South Africa Department of Forestry: Forestry development in South Africa and annual report for the year ended 31st March, 1931. 56 pp. map. Pretoria, 1932.
- Troup, R. S.: Exotic forest trees in the British Empire. 259 pp. maps. The Clarendon Press. Oxford, England, 1932.
- Tryon, N. H.: A study of several coniferous under-plantings in the upper Hudson highlands. 27 pp. illus. (Black Rock Forest bulletin no. 3.) Cornwall, N. Y., 1932.
- Ecology, October, 1931.—The period of height growth in some northeastern conifers, by H. I. Baldwin, pp. 665-689.
- Forestry Chronicle, February, 1932, vol. 8, no. 1.—Cooperation between forest schools and the industry in forest education, by A. Koroleff, pp. 5-13; Modern tendencies in forestry education, by H. W. Eades, pp. 14-20; Forestry education, by C. D. Howe, pp. 21-27; Forestry education, by E. Wilson, p. 28; Forest schools curricula and the needs of our woods operations, by W. A. Delahey, pp. 29-34; Suggested changes in forest-school courses, by A. R. Fenwick, pp. 35-40; A typical forest-school curriculum, being a list of subjects in the curriculum of the faculty of forestry, University of Toronto, pp. 41-45.
- Forstarchiv, February 15, 1932.—Untersuchungen über die rindenstärke der kiefer, by E. Wiedemann, pp. 61-72.
- Indian Forester, January, 1932.—Safe working stresses for Indian timbers, by L. N. Seaman, pp. 57-63.
- February, 1932.—Taungya in Garo Hills division, Assam, by R. N. De, pp. 93-99.
- Monthly Bulletin of Agricultural Science and Practice, January, 1932.—Recent research on the influence of forests in checking erosion and surface run-off, by C. Cabianca, pp. 25-35.
- Paper Trade Journal, February 4, 1932.—Effect of relatively high sulphur-dioxide concentration in sulphite pulping, by G. H. Chidester and J. N. McGovern, pp. 40-42.
- Southern Lumberman, February 15, 1932.—Mixed stands produce pine lumber of higher grade, by B. H. Paul, pp. 44-45.
- Tharandter Forstliches Jahrbuch, 1932.—Zur epidemiologie von mäuseplagen, by H. Prell, pp. 73-97.
- Timberman, March, 1932.—Fighting hemlock looper from the air, by C. S. Cowan, pp. 15, 32; Forest-fire equipment developments, by W. B. Osborne, pp. 17, 36.
- Zeitschrift für Forst- und Jagdwesen, February, 1932.—Ueber schnellwuchs betrieb, by Gehrhardt, pp. 65-82.

Articles in Periodicals

- American Forests, March, 1932.—My experience with fire in longleaf pine, by P. N. Howell, pp. 155-157, 184.
- Bulletin of the Torrey Botanical Club, January, 1932.—An international program for a world-wide study of woods, by S. J. Record, pp. 29-33.
- Centralblatt für das Gesamte Forstwesen, January, 1932. Ueber die klimatischen möglichkeiten des anbaues der küstendouglasie (*Pseudotsuga taxifolia*, var. *virides*) in Oesterreich, by H. Schwarz, pp. 11-20.



Structural characters of Canadian woods are described and illustrated in a bulletin issued by the Forest Products Laboratories of Canada, "The Identification of Woods," Canadian Forest Service Bulletin 81. The regions in which the trees grow, their principal uses, and keys for identification are given for all important native trees of Canada, as well as for many others whose products are common in Canadian markets.